Notice No.1

Rules and Regulations for the Classification of Naval Ships, January 2021

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: June 2021

Amendments to	Effective date	IACS/IMO implementation (if applicable)
Volume 1, Part 1, Chapter 2, Section 3	1 July 2021	N/A
Volume 1, Part 1, Chapter 3, Section 14	1 July 2021	N/A
Volume 1, Part 3, Chapter 1, Section 4	1 July 2021	N/A
Volume 1, Part 3, Chapter 2 Sections 2 & 8	1 July 2021	N/A
Volume 1, Part 3, Chapter 4, Sections 1 & 7	1 July 2021	N/A
Volume 1, Part 3, Chapter 5, Sections 5 & 8	1 July 2021	N/A
Volume 1, Part 4, Chapter 1, Section 1	1 July 2021	N/A
Volume 1, Part 4, Chapter 2, Section 10	1 July 2021	N/A
Volume 1, Part 6, Chapter 2, Section 5	1 July 2021	N/A
Volume 1, Part 6, Chapter 3, Sections 10 & 11	1 July 2021	N/A
Volume 1, Part 6, Chapter 4, Section 4	1 July 2021	N/A
Volume 1, Part 6, Chapter 5, Section 3	1 July 2021	N/A
Volume 1, Part 6, Chapter 6, Section 4	1 July 2021	1 July 2021
Volume 1, Part 6, Chapter 6, Section 6	1 July 2021	N/A

Lloyd's Register

Volume 1, Part 1,
Chapter 2
Classification Regulations

■ *Section 3*
Character of Classification and Class notations

3.5 Ship type notations

(Part only shown)
3.5.8 **NS3** vessels:

a) For vessels being built to the **NS3** notation, the following shall apply where the vessel is also being designed and built to comply with appropriate statutory regulations for the intended service of the vessel.
b) LR is to be contracted to issue Statements of Compliance with the nominated statutory regulation. Appropriate statutory regulations may include, but are not limited to:
   i) *SOLAS - International Convention for the Safety of Life at Sea*.
   ii) Code of Safety for Special Purpose Ships (SPS Code).
   ~~iii) UK MCA Small Commercial Vessel and Pilot Boat (SCV) Code or similar recognised regulation or National Standard~~
   iii) LR's Grey Boat Code – A Code of Practice for the Safety Assurance of Small Boats in Government Service.
   iv) UK MCA Workboat Code.

3.8 Military Distinction notations

(Part only shown)
Table 2.3.1 Hull, Military and Other Class Notations

Other Notations
Others
LI Approved Loading Instrument
~~**HPMS**~~ ~~Hull Planned Maintenance Scheme~~

3.10 Other notations

~~3.10.19 **HPMS.** This notation will be assigned where the hull structure has an approved planned maintenance scheme that incorporates maintenance and inspections by authorised ship's staff and the requirements of *Vol 1, Pt 1, Ch 3, 14 Hull planned maintenance – HPMS* are complied with.~~

Existing paragraphs 3.10.20 to 3.10.27 have been renumbered 3.10.19 to 3.10.26.

Volume 1, Part 1,
Chapter 3
Periodical Survey Regulations

Existing Section 14 has been deleted in its entirety.

Existing Sections 15 to 17 have been renumbered 14 to 16.

Volume 1, Part 3,
Chapter 1
General

■ *Section 4*
Information required

4.1 Submission of plans and data

4.1.1 Plans and data required to be submitted are indicated in *Vol 1, Pt 4, Ch 1, 1.2 Plans* and *Vol 1, Pt 6, Ch 1, 2.2 Plans to be submitted*.

Volume 1, Part 3, Chapter 2
Ship Design

■ *Section 2*
Rule structural concept

2.3 Definitions and structural terms

2.3.4 Critical structure is structure where the loss of a single element, such as a pillar, or section of deck or bulkhead between primary members, could lead to a collapse of the hull girder or a main deck.

■ *Section 8*
Pillars and pillar bulkheads

8.1 General

8.1.3 Where a residual strength assessment is required, this is to include an additional assessment for any pillars or pillar bulkheads identified as critical structure, *see Vol 1, Pt 6, Ch 4, 4.1 Application 4.1.8*.

Volume 1, Part 3,
Chapter 4
Closing Arrangements and Outfit

■ *Section 1*
Introduction

1.1 General

1.1.7 In general, closing arrangements and outfit should be positioned so as to avoid direct weapon recoil, blast or efflux loads however, where this is not the case, they are to be additionally examined for structural integrity and tightness when subject to the loads defined in *Vol 1, Pt 4, Ch 2, 9 Military installation and operational loads* as applicable.

■ *Section 7*
Air and sounding pipes

7.3 Closing appliances

7.3.2 Closing appliances are to be of an approved automatic type~~.~~ where they are below the limit of watertight integrity, *see Vol 1 Pt 3, Ch 2, 1.3 Watertight and weathertight integrity*. Where the limit of watertight integrity is defined by a bulkhead deck or freeboard deck, the closing appliances are to be of an approved automatic type where, with the ship at its design draught, the openings are immersed at an angle of heel of 40° or, the angle of down flooding if this is less than 40°, which may be agreed on the basis of stability requirements.

7.3.3 Where the closing appliances are not of an automatic type, provision is to be made for relieving the vacuum when the tanks are being pumped out.

Volume 1, Part 3,
Chapter 5
Anchoring, Mooring, Towing, Berthing, Launching, Recovery and Docking

■ *Section 5*
Anchor cable

5.5 Cable stopping and release arrangements

5.5.1 It is recommended that suitable bow chain stoppers be provided. Where cables pass through stoppers, these stoppers are to be manufactured from ductile material and be designed to minimise the possibility of damage to, or snagging of, the cable. They are to be capable of withstanding without permanent deformation a load equal to 80 per cent of the Rule breaking load of the cable passing over them. The corresponding stresses induced in the supporting structure are not to exceed the allowable values given in *Table 5.5.1 Allowable stresses in windlass and chain stopper supporting structure.* The capability of the supporting structure to withstand buckling is also to be assessed.

Table 5.5.1 Allowable stresses in windlass and chain stopper supporting structure

	Permissible stress N/mm^2
Normal stress (*see* Note 1)	1,00 σ_0
Shear stress	0,58 σ_0
Combined stress (*see* Note 2)	1,00 σ_0
Symbols	
σ_0 = specified minimum yield stress, N/mm^2	
Note 1 Normal stress is defined as the sum of bending and axial stresses. Note 2 Combined stress refers to equivalent von Mises stress.	

■ *Section 8*
Anchor windlass design and testing

8.13 Seatings

8.13.1 The windlass is to be efficiently bedded and secured to the deck. The thickness of the deck in way of the windlass is to be increased, and the supporting structure for the anchor windlass should be examined for the brake holding loads specified by *Vol 1, Pt 3, Ch 5, 8.4 Windlass design*. The allowable stresses specified in *Table 5.5.1 Allowable stresses in windlass and chain stopper supporting structure* are to be used to derive the net scantlings of the supporting structure. The capability of the supporting structure to withstand buckling is also to be assessed. The structural design integrity of the bedplate is the responsibility of the Builder and windlass manufacturer.

8.14 Structural requirements for windlasses on exposed fore decks

(Part of only shown)

8.14.9 The windlass is to be efficiently bedded and secured to the deck. The thickness of the deck in way of the windlass is to be increased. Adequate stiffening of the deck in way of the windlass is to be provided. The scantlings of the supporting structure and deck are to be determined by additional calculations applying the weight of the windlass combined with the resultant force on the seat due to the application of the following design loads:

- P_x (as defined in *Vol 1, Pt 3, Ch 5, 8.14 Structural requirements for windlasses on exposed fore decks 8.14.4*);
- P_y;
- P_x and P_y combined~~;~~.

~~The allowable stresses given in *Table 5.8.2 Allowable stress in windlass supporting structure for green sea loading* are not to be exceeded.~~ The allowable stresses specified in *Table 5.5.1 Allowable stresses in windlass and chain stopper supporting structure* are to be used to derive the net scantlings of the supporting structure. The capability of the supporting structure to withstand buckling is also to be assessed.

Existing Table 5.8.2 Allowable stress in windlass supporting structure for green sea loading has been deleted.

Volume 1, Part 4,
Chapter 1
Military Design

■ *Section 1*
General requirements

1.2 Plans

(Part only shown)

1.2.3 Plans, and where requested, calculations ~~should~~ are to be submitted for the following features and loadings as appropriate:

- Weapon recoil and thrust loadings.
- Blast and efflux loadings and pressure curves.
- Arcs of fire and blast or efflux impact zones for weapons.

Volume 1, Part 4,
Chapter 2
Military Design and Special Features

■ *Section 10*
Aircraft operations

10.5 Loading

(Part only shown)

10.5.1 The load cases to be applied to all parts of the structure are defined in *Table 2.10.6 Design load cases for primary and secondary deck stiffening and supporting structure*. in which:

W_{ty} = landing or static load, on the tyre print, in kN; with the centre of gravity in a position that causes the highest load. In the absence of specific aircraft manufacturers' information on the ~~static or~~ dynamic distribution of load, W_{ty} is to be taken as W_{auw} ~~divided equally between the two main undercarriages ignoring the nose or tail wheel. For helicopters with twin main rotors W ty is to be taken as W auw~~ distributed between all main undercarriages in accordance with the static load distribution. The contribution of small nose or tail wheels is to be ignored. The structure only needs to be assessed for the worst-case wheel loads and orientation.

10.9 Deck stiffening design

Table 2.10.6 Design load cases for primary and secondary deck stiffening and supporting structure

Condition	Loading					
	Plate F_{typ} kN	Stiffening			Support structure	
		P_{tyw} kN/m^2	Point loads F_{tys} kN	Self weight F_{tym} kN	Vertical kN	Horizontal kN
Emergency landing	λf ~~W~~W_{ty}	0,2	$DLF\ \lambda f W_{ty}$	$(1 + a_z) W_s$	Self weight W_{pl} plus landing loads from all wheels	0,5 W_{auw} 0,5 W_{auw} + 0,5 W_{pl}
Normal landing	0,6 λW_{ty}	0,5	0,6 $DLF\ \lambda W_{ty}$	$(1 + a_z) W_s$		
Take off (fixed wing)	2,65 W_{ty}	0,5	2,65 W_{ty}	$(1 + a_z) W_s$		
Manoeuvring internal	1,6 W_{ty}	—	1,6 W_{ty}	$(1 + a_z) W_s$		
Manoeuvring external	1,75 W_{ty}	0,5	1,75W_{ty}	$(1 + a_z) W_s$		
Parking internal	$(1 + 0{,}6a_z)\ W_{ty}$	—	$(1 + 0{,}6a_z)\ W_{ty}$	$(1 + a_z) W_s$		
Parking external	$1{,}1(1 + 0{,}6a_z)\ W_{ty}$	2	$1{,}1(1 + 0{,}6a_z)\ W_{ty}$	$(1 + a_z) W_s$		

W_{ty}, W_{auw} and f as defined in *Vol 1, Pt 4, Ch 2, 10.5 Loading*
λ is defined in *Vol 1, Pt 4, Ch 2, 10.8 Deck plating design*

W_{pl} = structural weight of helicopter platform, in kN

W_s = structural weight of stiffener and supported structure, in kN

P_{tyw} = uniformly distributed vertical load over entire landing area, kN/m^2

DLF = Dynamic load factor — Fixed wing 1,35 for secondary stiffening, 1,5 for primary stiffening.

a_z is defined in *Vol 1, Pt 5, Ch 3, 2 Motion response* — Helicopters 1,2 for secondary stiffening, 1,5 for primary stiffening.

Note *1.* For the design of the supporting structure for helicopter platforms applicable ~~self weight~~ self-weight and horizontal loads are to be added to the landing area loads.

Note *2.* The helicopter is to be so positioned as to produce the most severe loading condition for each structural member under consideration.

Note *3.* Stiffening members may have more than one point load acting at one time.

Note *4*. The dynamic load factor may be determined from *Vol 1, Pt 6, Ch 2, 5 Dynamic loading* based on the structural natural frequency response.

10.10 Parking and manoeuvring areas

10.10.2 For areas where only manoeuvring occurs and parking is restricted to designated and clearly marked areas then the scantlings of structure are to be calculated in accordance with *Vol 1, Pt 4, Ch 2, 10.8 Deck plating design* and *Vol 1, Pt 4, Ch 2, 10.9 Deck stiffening design* using the manoeuvring and parking loads given in *Table 2.10.6 Design load cases for primary and secondary deck stiffening and supporting structure* as appropriate. If parking areas are not clearly marked then the parking loads in *Table 2.10.6 Design load cases for primary and secondary deck stiffening and supporting structure* are to be applied to all areas of aircraft operation outside the landing area. ~~W_{ty}~~ W_{ty} may be determined ~~from the static distribution of the load or in the absence of specific information shared equally between the tyres. The loads for non-pneumatic tyres will be specially considered~~ as stated in *Vol 1, Pt 4, Ch 2, 10.5 Loading 10.5.1*.

Volume 1, Part 6,
Chapter 2
Hull Construction in Steel

■ *Section 5*
Dynamic loading

5.1 General

5.1.3 For flight deck landing loads, the emergency landing load can be represented by a triangular pulse load. The rise time, t_1, for these impact pressures can be estimated from the time taken to depress the tyre and oleo strut to their maximum deflection and the assumed maximum vertical landing velocity. For fixed wing aircraft, the rise time for a structural element will also depend on forward speed as the aircraft traverses the structure.

Volume 1, Part 6,
Chapter 3
Scantling Determination

■ *Section 10*
Deck structures

10.1 General

10.1.5 For vehicle decks and areas for aircraft operations, the deck scantlings are to comply with the requirements of *Vol 1, Pt 4, Ch 3, 2 Vehicle decks and fixed ramps* and *Vol 1, Pt 4, Ch 2, 10 Aircraft operations* respectively. ~~Areas of deck subject to blast loads are to comply with the requirements of *Vol 1, Pt 4, Ch 2, 9 Military installation and operational loads*~~

10.1.8 Deck areas and deck structures subject to weapon recoil, blast or efflux loads are to be additionally examined for compliance with the requirements of *Vol 1, Pt 6, Ch 3, 10.1 General 10.1.2* for the loads defined in *Vol 1, Pt 4, Ch 2, 9 Military installation and operational loads* as applicable.

■ *Section 11*
Superstructures, deckhouses and bulwarks

11.1 General

11.1.6 Superstructures, deckhouses and bulwarks should be positioned so as to avoid direct weapon recoil, blast or efflux loads, however, where this is not possible they are to be additionally examined for compliance with the requirements of *Vol 1, Pt 6, Ch 3, 11.1 General 11.1.2* for the loads defined in *Vol 1, Pt 4, Ch 2, 9 Military installation and operational loads* as applicable.

Volume 1, Part 6,
Chapter 4
Hull Girder Strength

■ *Section 4*
Residual Strength Assessment, RSA

4.1 Application

4.1.8 In addition, the residual strength of the hull girder or main deck following the failure of any single critical structural element is also to be considered. *See Vol 1, Pt 3, Ch 2, 2.3 Definitions and structural terms*. A review of the structural arrangement is to be made to establish the locations of any critical structure and a separate assessment made as to the impact of their individual failure on the strength of any main deck or the hull girder or. The method of review and assessment are to be agreed with LR.

Existing paragraph 4.1.8 has been renumbered 4.1.9.

Volume 1, Part 6,
Chapter 5
Structural Design Factors

■ *Section 3*
Scantling determination for NS2 and NS3 ships

3.1 Design criteria

(Part only shown)

Table 5.3.2 Allowable stress factors *f* ₁

Structural item		Limiting stress and other criteria							
Longitudinally effective structure		Combined Stress	Longitudinal stress or stiffener bending stresses	Shear stress in Plating and Stiffener webs	Local plate bending	Deflection ratio for primary members and secondary stiffeners (3)	Buckling factor (5) Compressive stresses	Buckling factor (7) Shear stresses
Structure subjected to military or operational loads, e.g. gun blast, missile efflux, or for aircraft and vehicle operation (8) (Additional requirements in accordance with ~~Pt 4, Ch 3, 2)~~ *Vol 1, Pt 4, Ch 2, 9 Military installation and operational loads*, *Vol 1, Pt 4, Ch 2, 10 Aircraft operations*, and *Vol 1, Pt 4, Ch 3, 2 Vehicle decks and fixed ramps*)		Combined Stress	Primary member and stiffener bending stress	Shear stress in primary member and Stiffener webs	Local plate bending	Deflection ratio for primary members and secondary stiffeners (3)	Buckling factor of safety (6)	Buckling factor of safety (7)
Normal stress descriptor		σ_{vm}	σ_x or σ_y	τ_{xy}	σ_b	f_δ	λ_σ	λ_τ
Aircraft normal landing, manoeuvring stowage and take-off areas	secondary stiffeners	-	0,75 (8)	0,75	-	0,00100 (1)	-	-
	primary members	0,70	0,65 (8)	0,65	-	0,00080 (2)	-	-
	secondary stiffeners	-	0,75 (8)	0,75	0,9	-	-	-

Deck and superstructure areas exposed to gun blast or missile efflux	primary members	-	0,65 (8)	0,65		-	-	-

Volume 1, Part 6, Chapter 6 Material and Welding Requirements

■ *Section 4* Requirements for welded construction

4.6 Inspection of welds

4.6.4 For the items butt and seam welds in plating, shown in *Table 6.4.1 Recommended extent of NDE checkpoints*, consideration may be given for a reduction in inspection frequency for welds where volumetric inspection and the quality assurance techniques applied indicate satisfactory quality.

■ *Section 6* Construction details

6.5 Arrangement at intersection of continuous secondary and primary ~~and secondary~~ members

6.5.5 The breadth of cut-outs is to be as small as practicable, with the top edge suitably radiused. Cut-outs are to have smooth edges, and the corner radii are to be as large as practicable~~,~~. Where the web depth is greater than 100 mm the corner radii are to be ~~with~~ a minimum of 20 per cent of the breadth of the cut-out or 20 mm, whichever is the greater~~.~~, and for ~~For~~ large cut-outs greater than 250 mm deep, ~~it is recommended that~~ the web plate connection to the hull envelope, or bulkhead, should end in a smooth tapered 'soft toe'. Recommended shapes of cut-out are shown in *Figure 6.6.4 Typical lug connections*, but consideration will be given to other shapes on the basis of maintaining equivalent strength and minimising stress concentration.

6.5.13 The load transmitted through the intersection arrangement is to be determined using the design pressure for the structural element being assessed in accordance with *Vol 1, Pt 5, Ch 3 Local Design Loads.*

6.5.14 Total load, *P*, transmitted to the primary member from the secondary member is to be derived by:

$$P = \frac{s}{1000}\left(S - \frac{s}{2000}\right)p \text{ in kN}$$

where

s = secondary stiffener spacing, mm

S = primary stiffener spacing, m

p = design plating pressure, kN/m^2

P = total load, kN

6.5.15 The arrangement of lug/collar/direct connection to the primary web stiffener determines the load apportioned to each component. The effect on each component of the intersection is to be assessed for shear and direct stress. Where the web stiffener is not connected to the secondary member, the load, *P*, is transmitted through the lug/collar/direct connection.

Existing Figure 6.6.4 Typical lug connections has been deleted and replaced with below;

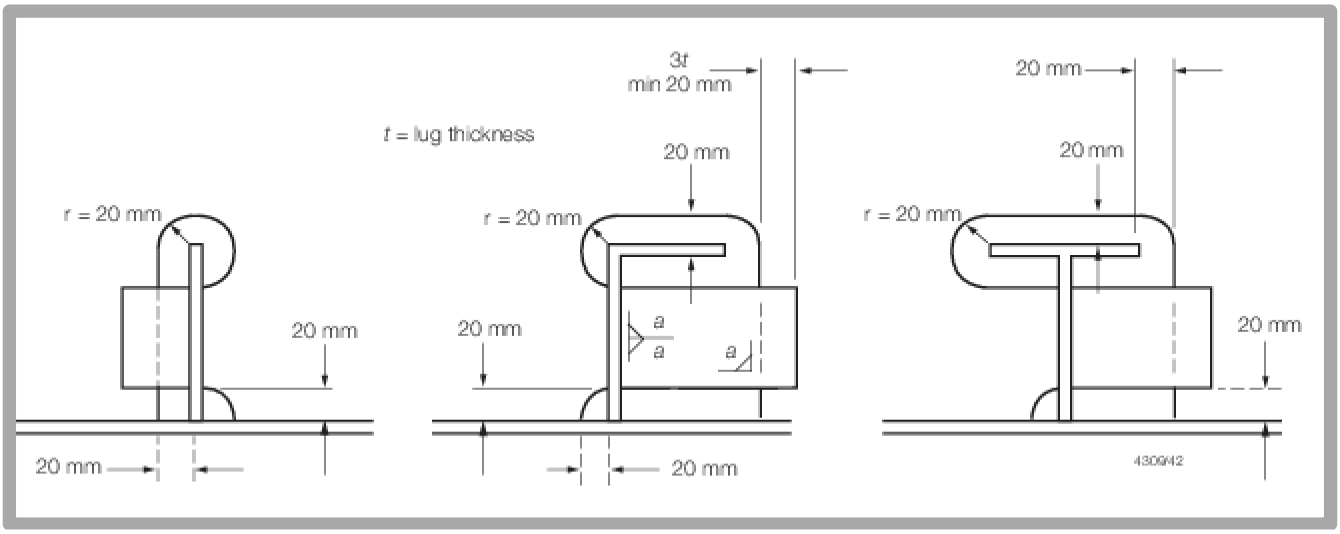

Figure 6.6.4 Typical lug connections

Published by Lloyd's Register Group Limited
Registered office (Reg. no. 08126909)
71 Fenchurch Street, London, EC3M 4BS
United Kingdom